Nest site selection of Lewis's woodpeckers in burned cottonwood riparian areas of the Frank Church Wilderness

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Abstract:

The population decline of Lewis's woodpeckers (*Melanerpes lewis*) has made it a species of special concern. It is an aerial insectivore, and prefers relatively open, burned forest or riparian habitat. As a poor excavator, it often uses preexisting cavities for its nests. This study attempted to determine what factors influence nest site selection in riparian areas of the Frank Church Wilderness. Study areas were located along burned riparian zones with cottonwood (*Populus* spp.) and Douglas fir (*Pseudotsuga* spp.). Five nesting pairs were located with two nesting in cottonwood and three nesting in Douglas fir. Each nest tree was paired with a randomly selected tree of the same species within the study site. Due to a small sample size this was a descriptive study, without statistics. For cottonwood nests there was more herbaceous ground cover at nest sites than random sites. At Douglas fir nests there was a greater height and DBH (diameter at breast height) at nest trees and smaller stem counts surrounding the nest trees than surrounding random trees. For both cottonwood and Douglas fir sites the overstory cover was greater above random trees.

Background:

Populations of Lewis's woodpeckers (*Melanerpes lewis*) have been declining on a national level (Gentry & Vierling 2007, Saab & Vierling 2001) which has made them a species of special concern throughout their range (Gentry & Vierling 2007). The Idaho Department of Fish and Game's Comprehensive Wildlife Conservation Strategy (CWCS)

plan has listed them as a species of greatest conservation need (SGCN) (Idaho Department of Fish and Game 2005).

Nest site selection of the Lewis's woodpecker is influenced by its feeding habits and driven in part by its skull morphology. Its primary habitats are post burn areas dominated by ponderosa pine (*Pinus ponderosa*) and riparian areas dominated by cottonwood (*Poplus* spp.) (Vierling 1997, Linder & Anderson 1998, Saab & Vierling 2001, Gentry & Vierling 2007). Lewis's woodpeckers are aerial insectivores, and prefer areas relatively free from upper story vegetation. Open habitats probably allow for better maneuverability and visibility (Linder & Anderson 1998, Saab & Vierling 2001). Lewis's woodpeckers also have skulls poorly developed for wood drilling (Bock 1970, Vierling 1997), making them weak cavity nesters (Saab & Dudley 1998, Gentry & Vierling 2004, Saab et al. 2004). They either create cavities in dead or decaying wood, or reuse old nest sites of other birds (Vierling 1997, Gentry & Vierling 2004, Saab et al. 2004). This limits their ability to choose nests sites, though burned areas often provide a greater abundance of dead and decaying wood.

This study was conducted at the Taylor Ranch research station in the Frank Church Wilderness of No Return. This area provided an opportunity to study the habitat selection of this species relatively free from human interference. Previous studies on habitat selection had been conducted in burned pine areas (Saab & Vierling 2001, Gentry & Vierling 2007, Linder & Anderson 1998), but none had been done in burned riparian areas. Other studies that were conducted in riparian areas had been located in an agricultural matrix (Saab & Vierling 2001, Vierling 1997), but no studies on riparian habitat selection had been done in wilderness.

Taylor Ranch

Taylor Ranch Wilderness Field Station is situated in the Frank Church Wilderness. It has a history of fires that provide a variety of burn severities across the landscape, creating excellent habitat for the Lewis's woodpecker, which have a history of breeding there.

Objectives:

The main objective of this project was to determine the factors that influence nest site selection at three spatial scales. Data from nested areas was compared with that of random sites to contrast available habitat verses selected habitat. When data suggesting selection was discovered I attempted to explain why certain variables might be selected for or against and compared my findings with that of other studies.

Methods

Collection

Nests were located by walking riparian areas and either visually spotting birds or following calls and monitoring them for nesting behavior. Once birds were spotted they were observed for 40 to 60 minute sessions. Incubation and feeding of young requires one or both adults to visit the nest more often then once every 40 minutes, so we were able to determine their status with this observation. If no nesting behavior was detected

we returned the site every 2 to 3 days and attempted to relocate the pair and monitor them for another session.

Once a nest cavity was confirmed we determined the dimensions of the study site. The length and width of each study site was defined by the flat area of land that the nest tree was located in. Using GPS point we mapped out plots of 50 x 120 meters, oriented so that the entire plot fitted into the flat. To locate the random tree I used a random number generator to create a GPS point within the study site. The closest tree of the same species as the nest tree, with a diameter at breast height (DBH) of at least 35 centimeters was selected.

For both nest trees and random trees we measured DBH, total height, condition and species. At the microhabitat scale we will took vegetation measurements of shrub and snag densities. Following the BBIRD protocol (Martin et al. 1997) we used the nest tree, or random tree, as the center of our plot and collected vegetation data within 1, 3, and 5, meter radii, as well as data for all trees within and 11.3 meters. This data was collected from July 24 to August 4, 2008.

Analysis

As my sample size was extremely small, it was determined that this should be a descriptive study only, without formal statistics. Nests and random trees in cottonwoods were compared separately from those located in burned Douglas fir. This stratified sampling was necessary due to the extreme habitat differences in the burned pine and cottonwood areas.

Results

COTTONWOOD	Nest Tree	Random Tree
DBH (cm)	68.40	69.25
Tree height (m)	24.68	22.36
Ground Cover (%)	71.88	50.33
Overstory Cover (%)	21.45	38.48
Number of stems <2.5 (cm)	324.50	429

DOUGLAS FIR	Nest Tree	Random Tree
DBH (cm)	54.97	45.42
Tree height (m)	23.48	14.57
Ground Cover (%)	75.69	78.64
Overstory Cover (%)	21.67	30.42
Number of stems <2.5 (cm)	58.00	102

Discussion

This is the first study conducted on Lewis's woodpeckers in a riparian wilderness area. While originally we located 10 active pairs of birds, only 5 of those 10 nested. We believe that this may have been caused by a late spring cold spell that lasted several days and possibly delayed the insect hatch that the Lewis's woodpeckers rely on. When the Lewis's woodpeckers did nest it was two weeks later than predicted. Due to the low

sample size, I am unable to do any statistical analyses, so my discussion is based upon the trends I noted.

In the cottonwood sites, many of the vegetation characteristics were similar between nest and random sites. The major differences occurred between proportions of ground cover. There was more herbaceous ground cover at nest sites as compared to random sites, which may have supported the insects upon which Lewis's woodpeckers feed. In these sites there was little or no recruitment of cottonwoods, and all of the snags were old and showed signs of potential collapse. It is possible that selection may, by necessity, shift entirely to Douglas fir in the future for this area due to this lack of cottonwood recruitment.

In the Douglas fir sites, there were a few differences between nest and occupied sites. The height of the nest trees was slightly greater than the random trees. An increase in tree height with time since fire has been previously recorded (Saab et al. 2004) and may be driven by terrestrial nest predators. The decrease in stem counts at the nest sites as compared to the random sites may support this, as increased cover would provide nest predators greater protection. The average DBH of the Douglas fir nest trees was greater than the random trees, which is consistent with the recorded diameters in other studies (Linder & Anderson 1998, Russell et al. 2007).

For both habitat types, overstory cover was greater at randomly selected trees. This could be due to the greater maneuverability provided by an open canopy (Linder & Anderson 1998, Saab & Vierling 2001).

Conclusion

This project is especially useful as a pilot study for future research in the Frank Church Wilderness on Lewis's woodpeckers. Wilderness studies such as this are able to provide information on nest site selection and reproduction in the absence of pesticides and other human-related influences. However, no management implications can be derived from a study this small. I recommend that additional studies in the area should be conducted over a larger spatial scale and over a period of years. Lewis's woodpeckers are a Species of Greatest Conservation Need (SGCN) designated by the Idaho Department of Fish and Game and future long-term studies are needed to better understand habitat selection of this species.

Thanks

I would like to give special thanks to some of the amazing people who helped me with this project

Dr. Kerri Vierling, my project advisor, who has gone above and beyond helping me with questions and problems

Jim Akenson and **Holly Akenson** of Taylor Research Station who provided an amazing living environment and excellent, knowledgeable advice whenever it was needed

Amber Lankford, field partner and fellow researcher who collected this data with me

Curt and Adele Berklund for providing the Berklund Undergraduate Research Scholar Award, which funded this project

Citations:

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